PCT/KR 2004/001261
RO/KR 28. 05. 2004

대한민국특허청
KOREAN INTELLECTUAL PROPERTY OFFICE

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출 원 번 호 : PCT/KR2003/001345
Application Number

출 원 년 월 일 : 2003년 07월 07일
Date of Application JUL 07, 2003

출 원 인 : LG Electronics, Inc.
Applicant(s)

2004 년 05 월 28 일

특 허 청
COMMISSIONER

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

-TRANSLATION(RULE12.3)

6-1-2003-0010404-23

PCT/KR03/01345

2003.08.06

The in acco 수리관청 (이청승)

For receiving Office use only

PCT/KR 03/01345
International Application No.

07 JULY 2003 (07.07.03)
International Filing Date

Korean Intellectual Property Office
P C T International Application
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* FP03031

Box No. I TITLE OF INVENTION

HOME NETWORK SYSTEM

Box No. II APPLICANT ☐ This person is also inventor

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

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Applicant's registration No. with the Office 1-2002-012840-3

State *(that is, country)* of nationality: KR

State *(that is, country)* of residence: KR

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

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641-778, Kyungsangnam-Do, Republic of Korea

This person is:
☐ applicant only
☒ applicant and inventor
☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality: KR

State *(that is, country)* of residence: KR

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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Teleprinter No.
Agent's registration No. with the Office 9-1998-000470-8

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Form PCT/RO/101 (first sheet) (March 2001; reprint January 2003)

See Notes to the Request Form

2003. 8 08 진오

2003 8 0 접수

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Mark the applicable check-boxes below; at least one must be marked.

The following designations are hereby made under Rule 4.9(a):

Regional Patent

☒ **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZM Zambia, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

☒ **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ **EP** **European Patent:** AT Austria, BE Belgium, BG Bulgaria, CH & LI Switzerland and Liechtenstein, CY Cyprus, CZ Czech Republic, DE Germany, DK Denmark, EE Estonia, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, SI Slovenia, SK Slovakia, TR Turkey, and any other State which is a Contracting State of the European Patent Convention and of the PCT

☒ **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GQ Equatorial Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

☒ AE United Arab Emirates .....
☒ AG Antigua and Barbuda
☒ AL Albania .....
☒ AM Armenia .....
☒ AT Austria .....
☒ AU Australia .....
☒ AZ Azerbaijan .....
☒ BA Bosnia and Herzegovina .....
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☒ MK The former Yugoslav Republic of Macedonia .....
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Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM

Priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:* regional Office	international application: receiving Office
item (1) 30 May, 2003 (30/05/2003)	10-2003-34962	KR		
item (2)				
item (3)				
item (4)				
item (5)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office)* identified above as:

☐ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ item (4) ☐ item (5) ☐ other, see Supplemental Box

* *Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):* ....

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*

ISA / AT

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII DECLARATIONS

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) *(mark the applicable check-boxes below and indicate in the right column the number of each type of declaration)*: Number of declarations

☐ Box No. VIII (i)	Declaration as to the identity of the inventor	:
☐ Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	:
☐ Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	:
☐ Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America)	:
☐ Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	:

Box No. IX CHECK LIST; LANGUAGE OF FILING

The international application contains:

(a) **in paper form**, the following number of sheets:

request (including declaration sheets)	:	4
description (excluding sequence listings and/or tables related thereto)	:	11
claims	:	5
abstract	:	1
drawings	:	3
Sub-total number of sheets	:	24
sequence listings	:	
tables related thereto	:	
(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)		
Total number of sheets	:	24

(b) ☐ **only in computer readable form** (Section 801(a)(i))
- (i) ☐ sequence listings
- (ii) ☐ tables related thereto

(c) ☐ **also in computer readable form** (Section 801(a)(ii))
- (i) ☐ sequence listings
- (ii) ☐ tables related thereto

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the
- ☐ sequence listings: .....
- ☐ tables related thereto: .....

(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)

This international application is **accompanied by** the following item(s) *(mark the applicable check-boxes below and indicate in right column the number of each item)*:

		Number of items
1. ☒ fee calculation sheet	:	1
2. ☐ original separate power of attorney	:	
3. ☐ original general power of attorney	:	
4. ☒ copy of general power of attorney; reference number, if any:	:	2
5. ☐ statement explaining lack of signature	:	
6. ☐ priority document(s) identified in Box No. VI as item(s):	:	
7. ☐ translation of international application into *(language)*:	:	
8. ☐ separate indications concerning deposited microorganism or other biological material	:	
9. ☐ sequence listings in computer readable form *(indicate type and number of carriers)*	:	
(i) ☐ copy submitted for the purposes of international search under Rule 13*ter* only (and not as part of the international application)	:	
(ii) ☐ *(only where check-box (b)(i) or (c)(i) is marked in left column)* additional copies including, where applicable, the copy for the purposes of international search under Rule 13*ter*	:	
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11. ☐ other *(specify)*:	:	

Figure of the drawings which should accompany the abstract: 2

Language of filing of the international application: Korean

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

LEE, Kwang-Yeon

For receiving Office use only

1. Date of actual receipt of the purported international application: 07 JULY 2003 (07.07.03)
2. Drawings: ☐ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA / AT
6. ☐ Transmittal of search copy delayed until search fee is paid

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Date of receipt of the record copy by the International Bureau:

This sheet is not part of and does not count as a sheet of the international application.

PCT

FEE CALCULATION SHEET
Annex to the Request

For receiving Office use only

International Application No. PCT/KR 03/01345

Date stamp of the receiving Office 06.08.2003

Applicant's or agent's file reference: FP03031

Applicant: LG Electronics, Inc. et al

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE . . . . . 45,000 T

2. SEARCH FEE . . . . . 191,000 S

International search to be carried out by AT

(If two or more International Searching Authorities are competent to carry out the international search, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

Where items (b) and/or (c) of Box No. IX apply, enter **Sub-total number of sheets**
Where items (b) and (c) of Box No. IX do not apply, enter **Total number of sheets** } 24

b1 first 30 sheets 530,000 b1

b2 _____ (number of sheets in excess of 30) x _____ (fee per sheet) = _____ b2

b3 additional component (only if sequence listings and/or tables related thereto are filed in computer readable form under Section 801(a)(i), or both in that form and on paper, under Section 801(a)(ii)):

400 x _____ (fee per sheet) = _____ b3

Add amounts entered at b1, b2 and b3 and enter total at B . . . . 530,000 B

Designation Fees

The international application contains 93 designations.

5 (number of designation fees payable *(maximum 5)*) x 114,000 (amount of designation fee) = 570,000 D

Add amounts entered at B and D and enter total at I . . . . . 1,100,000 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT *(if applicable)* . . . . . P

5. TOTAL FEES PAYABLE . . . . . 1,336,000 TOTAL

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

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☐ cheque ☐ bank draft ☐ revenue stamps ☐ other *(specify)*:

AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT

(This mode of payment may not be available at all receiving Offices)

Receiving Office: RO/ _____

☐ Authorization to charge the total fees indicated above.

Deposit Account No.: _____

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Date: _____

Name: _____

☐ Authorization to charge the fee for priority document.

Signature: _____

See Notes to the fee calculation sheet

LEE & KIM
PATENT & TRADEMARK ATTORNEYS
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Yoksam 1-Dong, Kangnam-Ku
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GENERAL POWER OF ATTORNEY

I/We, the undersigned,

LG Electronics, Inc.
20 Yoido-dong Yongdungpo-ku Seoul 150-010 Republic of Korea

do hereby appoint LEE, Kwang-Yeon (9-1998-000470-8), KIM, Seon-Min (9-2000-000323-7) and KIM, Sun-Joon (9-2001-000372-1) registered patent attorneys of 5th Floor, New-Seoul Bldg. 828-8, Yoksam 1-Dong, Kangnam-Ku, Seoul 135-935, the Republic of Korea, as my/our true and lawful agent to represent the undersigned before all the competent International Authorities in connection with any and all international application filed by the undersigned with the Korean Intellectual Property Office (KIPO) as receiving Office and to make or receive payments on behalf of the undersigned.

Dated this 10 th day of March, 2003

Applicant LG Electronics, Inc. (Seal)

HOME NETWORK SYSTEM

TECHNICAL FIELD

The present invention relates to a home network system, and more particularly to, a home network system which uses a message structure for efficient communication between a plurality of home appliances.

BACKGROUND ART

Home automation for automatically controlling home appliances at home or remotely has almost reached a commercial use stage. At its early stage, the home automation separately controlled each home appliance by using a telephone or infrared rays, and did not connect the home appliances one another. However, there has been suggested a method for building a network of home appliances by using a communication means, and collectively managing the network by using a controller.

Fig. 1 is a structure view illustrating a general home network system. Referring to Fig. 1, a home network connects various digital home appliances so that a user can always enjoy convenient, safe and economic life services inside or outside the house.

As factors of the advent of the home network, refrigerators or washing machines called white home appliances have been gradually digitalized due to development of digital signal processing techniques, and new information home appliances have been made due to rapid development of home appliance operating system techniques and high speed multimedia communication techniques.

Here, an IT network is built to exchange data between a personal computer

and peripheral devices or provide internet services, and an AV network is built between home appliances using audio or video information. In addition, a living network is built to simply control home appliances, such as home automation or remote meter reading, and may be comprised of a refrigerator, washing machine, microwave oven, electric lamp, gas alarm, air conditioner and telephone.

The home network system includes a master device which is a home appliance for controlling an operation of the other home appliances or monitoring a status thereof, and a slave device which is a home appliance having a function of responding to the request of the master device and a function of notifying a status change according to properties of the home appliances or other factors. Here, the home appliances (or new devices) include home appliances for the living network service such as a washing machine and a refrigerator as well as home appliances for the IT network service and the AV network service.

In the conventional home network system, there are increasing demands for a message structure for precisely transmitting information between a plurality of home appliances (master devices and slave devices) connected to the home network system.

DISCLOSURE OF THE INVENTION

An object of the present invention is to provide a home network system which transmits a request message having a predetermined structure from a master device to a slave device by using layers between home appliances (master device and slave device).

Another object of the present invention is to provide a home network system which transmits a response message having a predetermined structure from a slave device to a master device by using layers between home appliances

(master device and slave device).

Yet another object of the present invention is to provide a home network system which transmits an event message having a predetermined structure from one home appliance to another home appliance by using layers between the home appliances.

In order to achieve the above-described objects of the invention, there is provided a home network system including: at least one slave device; and at least one master device connected to the slave device through a network, for transmitting a request message to the slave device, wherein the request message is transmitted from an upper layer of the master device to a lower layer thereof and from a lower layer of the slave device to an upper layer thereof, and has a command code implying an operation which will be executed by the slave device, and a related argument for executing the operation.

According to another aspect of the invention, a home network system includes: at least one master device; and a slave device connected to the master device through a network, for receiving a request message from the master device and transmitting a response message to the master device, wherein the response message is transmitted from an upper layer of the slave device to a lower layer thereof and from a lower layer of the master device to an upper layer thereof, and has a command code included in the request message for implying an operation which will be executed by the slave device, and a field for executing the request.

Preferably, when the request message has been normally executed, the field includes an ACK code.

Preferably, the response message further includes a field for notifying an execution result of the request message.

Preferably, when the request message has not been normally executed,

the field includes an NAK code.

Preferably, the command code includes an instantaneous command for allowing the slave device to receive the request message, directly execute the request message, and then transmit the response message.

Preferably, the command code includes a program command for allowing the slave device to receive the request message, transmit the response message to the master device, and then execute the request message.

According to another aspect of the invention, a home network system includes at least two devices, wherein, when a status of one device is changed, one device generates an event message and transmits the event message to the other device, and the event message is transmitted from an upper layer of one device to a lower layer thereof and from a lower layer of the other device to an upper layer thereof, and has a command code, an event code and a status value.

Preferably, the command code is '0x11'.

According to another aspect of the invention, a storage medium records a message structure in a home network system including at least one master device and slave device, wherein a request message from the master device to the slave device is transmitted from an upper layer of the master device to a lower layer thereof and from a lower layer of the slave device to an upper layer thereof, and has a command code implying an operation which will be executed by the slave device, and a related argument for executing the operation.

According to another aspect of the invention, a storage medium records a message structure in a home network system including at least one master device and slave device, wherein a response message to a request message from the master device to the slave device is transmitted from an upper layer of the slave device to a lower layer thereof and from a lower layer of the master device to an

upper layer thereof, and has a command code included in the request message for implying an operation which will be executed by the slave device, and a field for executing the request.

Preferably, when the request message has been normally executed, the field includes an ACK code.

Preferably, the message structure further includes a field for notifying an execution result of the request message.

Preferably, when the request message has not been normally executed, the field includes an NAK code.

Preferably, the command code includes an instantaneous command for allowing the slave device to receive the request message, directly execute the request message, and transmit the response message.

Preferably, the command code includes a program command for allowing the slave device to receive the request message, transmit the response message to the master device, and execute the request message.

According to another aspect of the invention, a storage medium records a message structure in a home network system including at least two devices, wherein an event message generated due to status change of one device is transmitted from an upper layer of one device to a lower layer thereof and from a lower layer of the other device to an upper layer thereof, and has a command code, an event code and a status value.

Preferably, the command code is '0x11'.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a structure view illustrating a general home network system;

Fig. 2 is a structure view illustrating a home network system in accordance

with the present invention;

Fig. 3A is a structure view illustrating a request message in accordance with the present invention;

Fig. 3B is a structure view illustrating a first example of a response message in accordance with the present invention;

Fig. 3C is a structure view illustrating a second example of the response message in accordance with the present invention; and

Fig. 3D is a structure view illustrating an event message in accordance with the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

A home network system in accordance with the present invention will now be described in detail with reference to the accompanying drawings.

Fig. 2 is a structure view illustrating the home network system in accordance with the present invention. Referring to Fig. 2, the home network system 100 includes at least one master device 50 and slave devices 60, 70 and 80 connected through a bus network 90. In addition, the home network system 100 further includes a gateway 30 for access to an external network (for example, internet), and a network manager 40 connected to the gateway 30, for providing an internet service and performing environment setting and resetting functions of home appliances of the home network system 100.

Here, the master device 50 performs the same functions as the general master device, and the network manager 40 performs similar functions to the master device 50 except for the internet service. For conveniences' shake, there are presumed that the network manager 40 performs functions such as a bridge for the internet service, and that only one master device 50 exists in the home network

system 100.

The bus network 90 can be a wire medium such as a specially-installed line, or a previously-installed power line or telephone line, or a wireless transmission medium. However, still referring to Fig. 2, the home network system 100 composes a closed network for connecting home appliances of one house through a wire or wireless transmission medium. At this time, the closed network includes a physically-connected but logically-divided network. In addition, the bus network 90 of the home network system 100 pursues to a different protocol from the external network. It is thus impossible to access the home appliances merely through the external network.

Fig. 3A is a structure view illustrating a request message in accordance with the present invention. As shown in Fig. 3A, the request message is transmitted from the master device 50 to the slave devices 60, 70 and 80, and has a command code for allowing the slave devices 60, 70 and 80 to execute a predetermined operation, and a related input argument for executing the operation.

The request message is transmitted from an upper layer of the master device 50 to a lower layer thereof under a predetermined control protocol of the home network system 100, and transmitted from lower layers of the slave devices 60, 70 and 80 to upper layers thereof through the bus network 90. Accordingly, control means (not shown) of the slave devices 60, 70 and 80 receive the request message and perform a predetermined operation.

Fig. 3B is a structure view illustrating a first example of a response message in accordance with the present invention. As depicted in Fig. 3B, the response message is a response to the request message of Fig. 3A, and has a command code included in the request message, an ACK (acknowledgement) and a return value.

The command code is a previously-inputted command code from the master device 50, which has been processed or will be processed in the slave devices 60, 70 and 80, the ACK implies that the request message has been normally executed, and the return value implies an execution result of the request message.

Fig. 3C is a structure view illustrating a second example of the response message in accordance with the present invention. As illustrated in Fig. 3C, the response message is a response to the request message of Fig. 3A, and has a command code included in the request message, an NAK (no acknowledgement) and an NAK code (or error code).

The command code is a previously-inputted command code from the master device 50, which has been processed or will be processed in the slave devices 60, 70 and 80, the NAK implies that the request message has not been normally executed, and the NAK code implies a non-execution reason. Here, the NAK code does not include transmission errors resulting from communication failure by message transmission.

Such response messages are transmitted from the upper layers of the slave devices 60, 70 and 80 to the lower layers thereof under a predetermined control protocol of the home network system 100, and transmitted from the lower layer of the master device 50 to the upper layer thereof through the bus network 90. Accordingly, a control means (not shown) of the master device 50 receives and processes the response messages.

The command codes of Figs. 3A to 3C are divided into an instantaneous command code and a program command code. The instantaneous command code can be executed by the slave devices 60, 70 and 80 directly after reception. When the slave devices 60, 70 and 80 receive the request message containing the

instantaneous command code, the slave devices 60, 70 and 80 must transmit the response message after executing the command. The program command code requires a sequence for execution. When the slave devices 60, 70 and 80 receive the request message containing the program command code, the slave devices 60, 70 and 80 must execute the command after transmitting the response message.

Fig. 3D is a structure view illustrating an event message in accordance with the present invention. Referring to Fig. 3D, the event message has a command code for notifying the event message, an event code and a status value.

The event message is generated because of status changes of the home appliances (master device 50 and slave devices 60, 70 and 80). According to generation reasons, event messages are classified into a user event generated due to a command directly from the user, a periodical event automatically generated at an interval of a predetermined time, a status event generated due to spontaneous status change during monitoring of the status of the home appliance, an error event generated due to an error relating to the operation of the home appliance, and an external event generated due to a request from the outside of the home network system 100.

In the case that the user (or master device 50) monitors the status of the home appliance, it is inefficient for the user to request the status value whenever he/she intends to know the status of the home appliance. That is, when the status value of the home appliance is changed, the home appliance can efficiently notify the status change by using the event message. In addition, a process for directly notifying the status change when the event is generated is necessary in order to directly notify a defect or error of the home appliance.

The event message uses the command code of 0x11, the event code contains a product code implying the home appliance relating to the event and an

event type, and the return value contains information of a value changed due to the event.

The message structures can be stored in a predetermined storage means of the master device and the slave device of the home network system, or transmitted through the bus network.

Although the preferred embodiments of the present invention have been described, it is understood that the present invention should not be limited to these preferred embodiments but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

What is claimed is:

1. A home network system, comprising:

at least one slave device; and

at least one master device connected to the slave device through a network, for transmitting a request message to the slave device,

wherein the request message is transmitted from an upper layer of the master device to a lower layer thereof and from a lower layer of the slave device to an upper layer thereof, and has a command code implying an operation which will be executed by the slave device, and a related argument for executing the operation.

2. A home network system, comprising:

at least one master device; and

a slave device connected to the master device through a network, for receiving a request message from the master device and transmitting a response message to the master device,

wherein the response message is transmitted from an upper layer of the slave device to a lower layer thereof and from a lower layer of the master device to an upper layer thereof, and has a command code included in the request message for implying an operation which will be executed by the slave device, and a field for executing the request.

3. The system of claim 2, wherein, when the request message has been normally executed, the field comprises an ACK code.

4. The system of claim 3, wherein the response message further comprises a field for notifying an execution result of the request message.

5. The system of claim 2, wherein, when the request message has not been normally executed, the field comprises an NAK code.

6. The system of claim 1 or 2, wherein the command code comprises an instantaneous command for allowing the slave device to receive the request message, directly execute the request message, and then transmit the response message.

7. The system of claim 1 or 2, wherein the command code comprises a program command for allowing the slave device to receive the request message, transmit the response message to the master device, and then execute the request message.

8. A home network system, comprising at least two devices,

wherein, when a status of one device is changed, one device generates an event message and transmits the event message to the other device, and the event message is transmitted from an upper layer of one device to a lower layer thereof and from a lower layer of the other device to an upper layer thereof, and has a command code, an event code and a status value.

9. The system of claim 8, wherein the command code is '0x11'.

10. A storage medium for recording a message structure in a home network

system including at least one master device and slave device,

wherein a request message from the master device to the slave device is transmitted from an upper layer of the master device to a lower layer thereof and from a lower layer of the slave device to an upper layer thereof, and has a command code implying an operation which will be executed by the slave device, and a related argument for executing the operation.

11. A storage medium for recording a message structure in a home network system including at least one master device and slave device,

wherein a response message to a request message from the master device to the slave device is transmitted from an upper layer of the slave device to a lower layer thereof and from a lower layer of the master device to an upper layer thereof, and has a command code included in the request message for implying an operation which will be executed by the slave device, and a field for executing the request.

12. The medium of claim 11, wherein, when the request message has been normally executed, the field comprises an ACK code.

13. The medium of claim 12, wherein the message structure further comprises a field for notifying an execution result of the request message.

14. The medium of claim 11, wherein, when the request message has not been normally executed, the field comprises an NAK code.

15. The medium of claim 10 or 11, wherein the command code comprises

an instantaneous command for allowing the slave device to receive the request message, directly execute the request message, and transmit the response message.

16. The medium of claim 10 or 11, wherein the command code comprises a program command for allowing the slave device to receive the request message, transmit the response message to the master device, and execute the request message.

17. A storage medium for recording a message structure in a home network system including at least two devices,

wherein an event message generated due to status change of one device is transmitted from an upper layer of one device to a lower layer thereof and from a lower layer of the other device to an upper layer thereof, and has a command code, an event code and a status value.

18. The medium of claim 17, wherein the command code is '0x11'.

ABSTRACT

The present invention discloses a home network system which uses a message structure for efficient communication between a plurality of home appliances. The home network system includes at least one slave device, and at least one master device connected to the slave device through a network, for transmitting a request message to the slave device, wherein the request message is transmitted from an upper layer of the master device to a lower layer thereof and from a lower layer of the slave device to an upper layer thereof, and has a command code implying an operation which will be executed by the slave device, and a related argument for executing the operation.

FIG.1

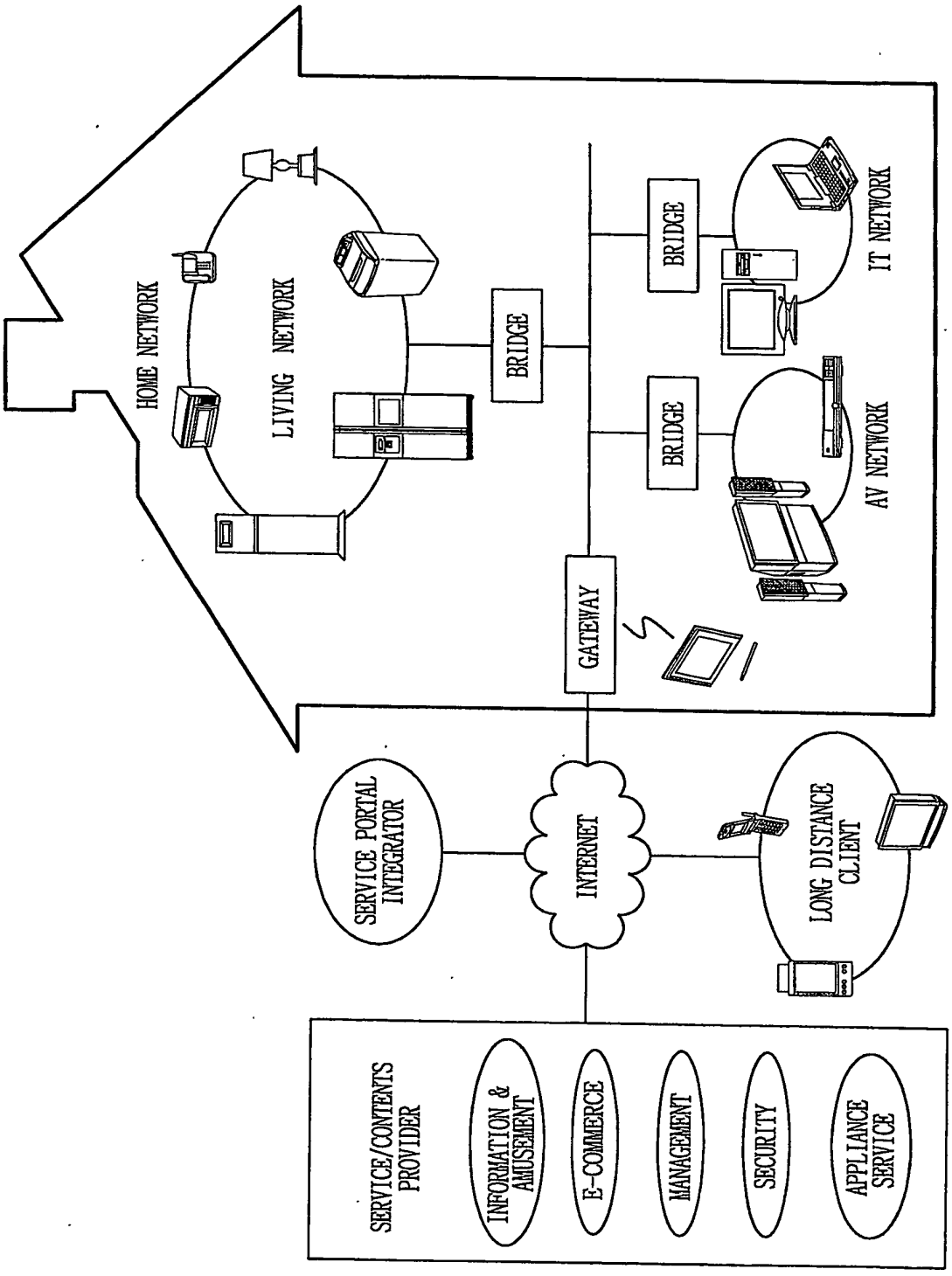
HOME NETWORK
LIVING NETWORK
BRIDGE
BRIDGE
BRIDGE
IT NETWORK
AV NETWORK
GATEWAY
SERVICE PORTAL INTEGRATOR
INTERNET
LONG DISTANCE CLIENT
SERVICE/CONTENTS PROVIDER
INFORMATION & AMUSEMENT
E-COMMERCE
MANAGEMENT
SECURITY
APPLIANCE SERVICE

FIG.2

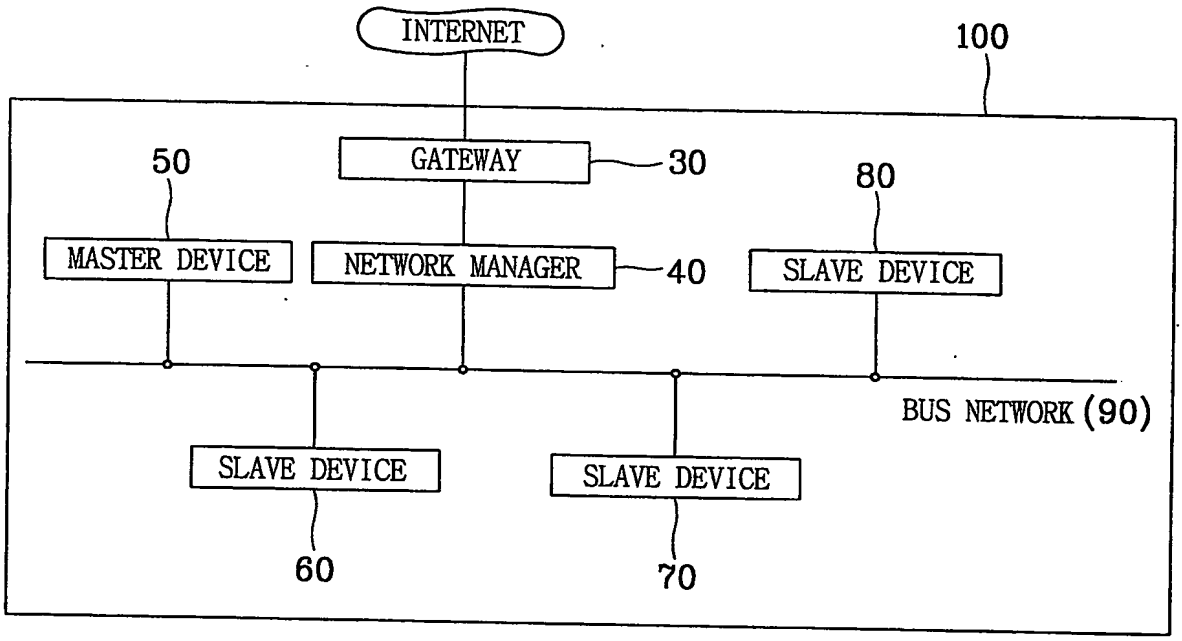
INTERNET
100
50
GATEWAY
30
80
MASTER DEVICE
NETWORK MANAGER
40
SLAVE DEVICE
BUS NETWORK (90)
SLAVE DEVICE
SLAVE DEVICE
60
70

FIG.3A

COMMAND CODE	INPUT ARGUMENT

FIG.3B

COMMAND CODE	ACK	RETURN VALUE

FIG.3C

COMMAND CODE	NAK	NAK-CODE

FIG.3D

COMMAND CODE	EVENT CODE	STATUS VALUE

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